Claims

[c1] 1.An internal combustion engine arrangement comprising:
an engine block with at least one combustion chamber with a passageway fluidly communicating with said combustion chamber, said combustion chamber slidably mounting a reciprocating piston therein;
a valve controlling fluid communication through said passageway;
a camshaft with lobes for contacting said valve to control a position of said valve;
a hydraulically powered variable cam timing unit to phase a rotation of said camshaft with respect to a position of said piston within said combustion chamber;
a first pump for providing pressurized oil for lubrication to said engine, said first pump additionally providing pressurized oil to said variable cam timing unit through a first check valve;
a second pump for providing pressurized oil to said variable cam timing unit through a second check valve; and
an accumulator connected between said first and second check valves to pressurize oil delivered to said variable cam timing unit.

[c2] 2.An internal combustion engine arrangement as described in claim 1 , wherein said accumulator is provided within an internal cavity of said camshaft of said engine arrangement.

[c3] 3.An internal combustion engine arrangement as described in claim 1 , having a plurality of camshafts with variable cam timing units.

[c4] 4.An internal combustion engine arrangement as described in claim 1 , wherein said second pump has a smaller capacity than said first pump.

[c5] 5.An internal combustion engine arrangement as described in claim 1 , wherein said second pump is powered by an electric motor.

[c6] 6.An internal combustion engine arrangement as described in claim 1 , wherein said second pump is powered by a crankshaft of said engine.

[c7] 7.An internal combustion engine as described in claim 1 , wherein said first

pump is powered by a crankshaft of said engine.

[c8] 8.An internal combustion engine arrangement as described in claim 1 , having a plurality of accumulators.

[c9] 9.An internal combustion engine arrangement comprising:
an engine block having a plurality of combustion chambers with inlet and exhaust passageways fluidly communicating with said combustion chambers, said combustion chambers slidably mounting a respective reciprocating piston therein;
an exhaust valve and an inlet valve controlling fluid communication through said inlet and exhaust passageways;
an inlet camshaft and an exhaust camshaft with lobes for connecting said inlet and exhaust valves to control a position of said valves;
hydraulically powered variable cam timing units that phase a rotation of said inlet and exhaust camshafts with respect to a position of said piston within said combustion chambers;
a first crank shaft driven first pump for providing pressurized oil for lubrication to said engine, said first pump additionally providing pressurized oil to said variable cam timing units through a first check valve;
a second oil pump for providing pressurized oil to said variable cam timing units through a second check valve; and
an accumulator connected between first and second check valves to pressurize oil delivered to said variable cam timing units.

[c10] 10.A method of operating an internal combustion engine comprising:
providing an engine block with at least one combustion chamber with a passageway fluidly communicating with said combustion chamber;
slidably mounting a reciprocating piston within said combustion chamber;
controlling fluid communication through said passageway with a valve;
contacting said valve with a camshaft to control a position of said valve;
hydraulically powering variable cam timing units to phase a rotation of said camshaft respective to a position of said piston within said combustion chamber;

providing pressurized oil lubrication of said engine with a first pump and additionally providing pressurized oil to the variable cam timing units through a first check valve;

providing pressurized oil to the variable cam timing units with a second pump through a second check valve; and

connecting between said first and second check valves an accumulator to pressurize oil delivered to said variable cam timing units.